

E-Asset & Tendering Management System

Ali Yusny Daud¹, Irma Suryani Abu Bakar², Ho Ming Hui³

^{*1,3}*School of Information Technology, Universiti Utara Malaysia, UUM Sintok, Malaysia*

²*Department of Electrical Engineering, Politeknik Sultan Abdul Halim Mu'Adzam Shah, POLIMAS Kedah, Malaysia*

Corresponding Author: Ali Yusny Daud

Abstract

E-Asset & Tendering Management System is a mobile application that lets sellers and buyers interact. The proposed mobile application aims to make transactions faster and more efficient for seller-buyer interactions and to enhance communication between parties. This paper provides an overview of the prototype's features and then evaluating its' usability and effectiveness. The project aimed to improve efficiency, create a user-friendly interface, and reduce labour-intensive tasks. To complete the project, five phases of methodology were carried out. The phases are project planning, requirement gathering, project design, project development, and project evaluation. The evaluation included a questionnaire to collect participant feedback, which provided insights into usability strengths and areas for improvement. This paper concludes with recommendations to improve the system's usability and help organisations achieve efficient tender and asset management processes.

Keywords: *E Asset, E Tender, Asset Management, Tendering Management.*

Date of Submission: 14-06-2024

Date of acceptance: 28-06-2024

I. INTRODUCTION

E-Asset & Tendering Management System is a system that aim to carry out tendering between buyers. The tendering is carried out at mobile application to let user make their bet with their smartphone through online connection. Asset Management refers to a system that can monitor and maintain things of value to a group. It is a method procedure for creating, using, maintaining, improving and getting rid of assets in the most economical way possible including all cost, risk and performance attributes. In the other hand, tender management is a service put out to seller in the marketplace. It allows multiple possible business to submit bids for the goods offered. They offer a fair fee for the goods. Tender management, proposal management or bid management refer to the process of creating and composing the proposal together with competitive price.

The objectives of this study are 1) to identify the requirement for the E-Asset & Tendering Management System; 2) to design and develop the E-Asset & Tendering Management System; and 3) to evaluate the developed E-Asset & Tendering Management System. This project aims to identify the requirement for E-Asset & Tender Management System and an in-depth analysis of the existing shortcomings of the previous system. The assessment includes gathering user feedback and critically examining the inconveniences faced by stakeholders during tender transactions.

A comprehensive evaluation of the current tendering process also been undertaken, including the use of multiple systems for product verification. By collating and analysing these findings, specific functionalities and features required to address the shortcomings of the legacy system are identified. In addition, it is essential to engage stakeholders, such as buyers and sellers, to understand their unique needs and incorporate their valuable perspectives into the system requirements. The identification of these requirements forms the basis for the design of a comprehensive and efficient ease of use for the system.

The design and development of the E-Asset & Tender Management System is carried out on the basis of the requirements identified in the previous phase. During the design phase, the system architecture, user interface and database structure are carefully planned to ensure seamless functionality and optimal user experience. Particular attention is paid to addressing the challenges highlighted during the requirements identification process, such as integrating all tendering activities into a unified platform and streamlining the product management process. A robust development approach is adopted, incorporating best practices and using appropriate software engineering methodologies. Throughout this phase, frequent testing and feedback loops are established to iteratively refine the features of the system to ensure its effectiveness, security and reliability.

Lastly evaluation of the developed E-Asset & Tender Management System involved rigorous testing and assessment of its performance against the pre-defined requirements and objectives. A combination of qualitative and quantitative methods is used to assess the functionality, efficiency and usability of the system. Feedback from key stakeholders, including buyers, sellers and administrators, are gathered and analysed to identify any remaining areas for improvement. The evaluation process also includes stress testing to determine the system's scalability and ability to handle increasing transaction loads. A comparative analysis between the new system and its predecessor also be carried out to measure the level of improvement achieved. The findings from this evaluation phase provides valuable insights for any necessary refinements and optimizations, ultimately leading to the successful deployment of an enhanced system.

The remaining passages in the text are organised as follows: The previous work is examined in the following section. The project's methodology is described in the section that follows. The proposed prototype for managing assets and requesting bids is shown in the fourth section. Section four presents and discusses the evaluation followed by findings and results section. Conclusions and recommendations for more research are included in the final section.

II. PREVIOUS WORK

In the previous work (at the time we did the research), there are two distinct web-based systems namely the E-Tender and Asset Management System, designed to enhance the efficiency and effectiveness of tendering processes and asset management in an organizational context. The E-Tender web application offers a modernized and user-friendly platform for engaging in tendering activities. Through user registration, stakeholders gain access to comprehensive tender information and product listings. On the other hand, the Asset Management System serves as a centralized repository for a company's product inventory, product management and enabling effective asset tracking. This paper provides a detailed examination of the functionalities and benefits of both systems, highlighting their contributions to digital solutions in business operations.

2.1 E-Tender

Figure 1 shows the E-Tender system. It is a web application designed to manage traditional tendering process [1]. Through this online platform users can access and interact with sellers and view their products. After registration, users can access and view what product has been posted by sellers. While buyers which is user can explore the product listing and get more information by clicking the product they are interested in. If a buyer is interested in the product, they can contact the seller via email or phone.



Figure 1: E-Tender System [1]

2.2 Asset Management System

Figure 2 shows Asset Management System. It serves as a tool for product management in a company. It is a web-based system that enables companies to store, update, search and remove products effortlessly [2]. The system enables companies to maintain, track and monitor the list of their products. Additionally, by leveraging this system, organizations can improve their product management processes and ensure effective availability of goods for their customers, enhancing overall operational efficiency.

The decision to create a new system stems from the need to address the significant flaws present in the current system. The reliance on two separate platforms for verifying buyers and checking product stock has posed challenges in seamlessly integrating new products into the system. Consequently, this multi-step process has resulted in delays, worsen the situation, particularly when buyers urgently require restocking. The accumulation of such hindrances has led to various predicaments for both the buyers and sellers involved in the tendering process. In light of these deficiencies, the development of an improved system has become a necessity, with the primary goal being to efficient and optimize the tendering process, while simultaneously ease operational challenges for all users.



Figure 2: Asset Management System [2]

The proposed E-Asset & Tendering Management System is an online application primarily focused on facilitating tendering and vendor interactions, with an administrative component to manage user data. The core function of this system revolves around vendors bidding among themselves for a one-month contract with the tender, with the highest bidder securing the contract. To participate in the bidding process, users need to register and specify whether they are tendering or vendors. Tender registration requires providing essential information such as the tender's name, email, username, password, and the type of electrical appliance. On the other hand, vendors need to furnish details such as their company name, email, username, and password. Once registered, buyers engage in competitive bidding by proposing their preferred price, and the seller selects the most desirable offer from among the submitted bids. The winner is notified by the system. Additionally, this system enables sellers to update their stock. They need to get approval by the admin of the system. After approval, the system generates a new tender list, allow the buyer to bid on the product once again.

III. METHODOLOGY

Waterfall methodology is used as the project management approach that emphasizes a linear progression from the beginning till the end of our project [3]. It follows a sequential process where each phase must be completed before moving on to the next. The different stages include Project Planning, Requirement Gathering, Project Design, Project Development, and Project Evaluation as shown in figure 3.

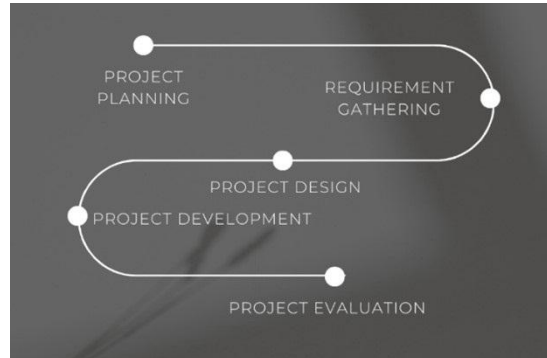


Figure 3: Methodology

3.1 Project Planning

In the Project Planning phase, the project's overall scope, objectives, and deliverables are defined in detail. Key stakeholders are identified, and the project team lays out a comprehensive plan that outlines the project's timeline, resource requirements, and budget allocation. This initial planning sets the foundation for the entire project and provides a roadmap for its successful execution [4]. In this project, project planning is conducted at early phase to guide the process of planning the application which is, defining project's objective and scope, creating a project plan to identify the timeline for the projects and conduct feasibility studies to evaluate project's feasibility in term of technical, operational and scheduling aspects.

3.2 Requirement Gathering

During the Requirement Gathering phase, the project team engages with stakeholders to elicit and document their specific needs and requirements. This involves conducting interviews, surveys, workshops, and other data-gathering techniques to understand the project's functional and non-functional requirements [5]. These requirements serve as the basis for the subsequent design and development phases. Next, to get more information about both systems, several articles and systems are being reviewed. To get more experience in designing the application for target users, some applications are being used and recorded as previous works that can be referred.

3.3 Project Design

In the Project Design phase, the project team transforms the gathered requirements into a detailed blueprint for the project's implementation. This phase involves designing the system architecture, defining the data structures, and specifying the user interface [6]. The design phase also includes creating prototypes or mock-ups to visualize the product and obtain feedback from stakeholders for validation and refinement. In this phase, the design of the application is conducted. A prototype of the application is designed, and the functions of the application are constructed within the prototype and have a several tests run to ensure there is no problem when the prototype is being used.

3.4 Project Development

Moving on to the Project Development phase, the actual implementation of the project takes place. The development team starts coding, constructing, and building the system or product based on the approved design [7]. This phase requires close coordination and collaboration among team members to ensure that the project progresses smoothly and aligns with the established plan. During the development phase, the prototype is tested again and again to find out which functions in the prototype need to be enhanced or to be improved to make sure that the functions meet the defined standards. Once the project is completed, the prototype is prepared for final testing and to be evaluated in the final phase.

3.5 Project Evaluation

Once the development is complete, the evaluation phase begins. This stage involves conducting a thorough assessment of the project's overall performance and outcomes [8]. The project team measures the project against the predefined success criteria and evaluates whether the objectives have been achieved. Lessons learned from the project are documented, and feedback from stakeholders is collected to identify areas for improvement and opportunities for future projects. After the prototype is completed, the application is released and lets the target user use the application. During the evaluation phase, user's feedback is taken in as consideration to resolve the problems and to refine the application.

IV. IMPLEMENTATION

Figure 4 shows the interface of the application. Users can select a role before entering the system. Admin page is for companies to approve new product adding and to approve quantity item that has been change while user page is for seller and buyer to bid item and add item into the application. It lets other users bid on the items.

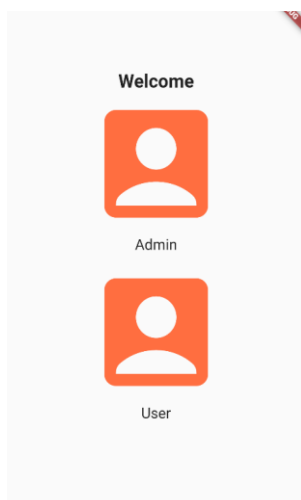


Figure 4: Interface

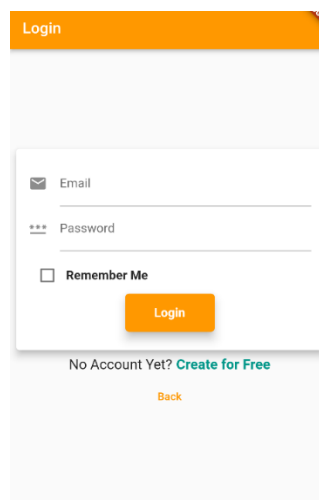


Figure 5: Login

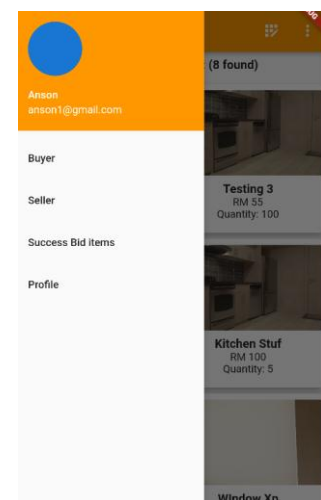


Figure 6: Main Page

Figure 5 shows the login page for users. Users can click on remember me to store the email and password so they can login immediately next time, user can create the account as well by clicking below. Figure 6 shows the main page of the application. By clicking the button, it shows functions that the user can access.

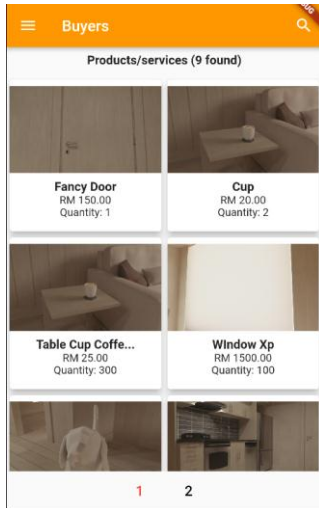


Figure 7: Buyer's Page

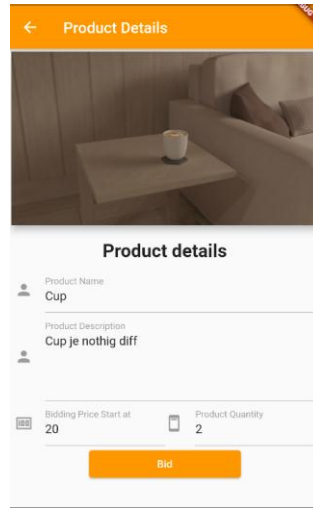


Figure 8: Product Details

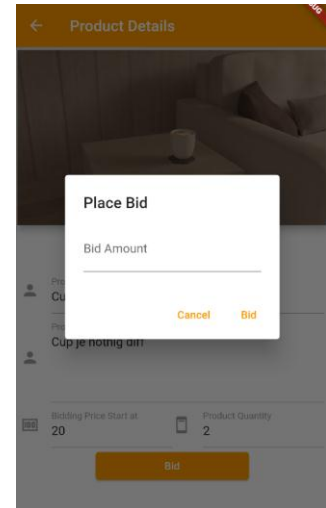


Figure 9: Bidding

Figure 7 shows that in buyer page there are some products are posted and user can bid the product by click into the item. In figure 8 shows that after user clicking the item, it shows the information of the product and a bid button below the product to let user bid if they wanted the item. Figure 9 shows that after clicking the bid button, it allows user to put in the amount of money that they wanted to bid on this item.

Figure 10 shows the seller page. In this page has the item posted by the seller and they can add new product by clicking New Product and view pending order by clicking My Order. Seller can also change the product quantity by clicking the product. Figure 11 shows that product quantity is being edited by the seller. The seller needs to wait for admin's approval to change the product quantity. In figure 12, by clicking New Product, seller can add a new product into their selling list to let other user to bid on the items. After adding the item, the item needs to await approval from admin before it can be viewed by the buyers on the buyer screen.

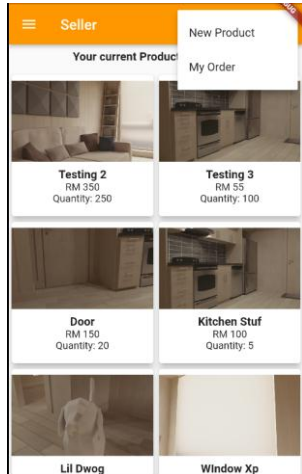


Figure 10: Seller's Page

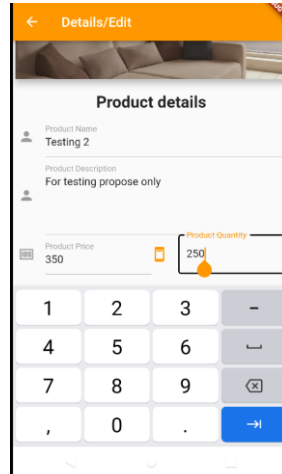


Figure 11: Editing Quantity

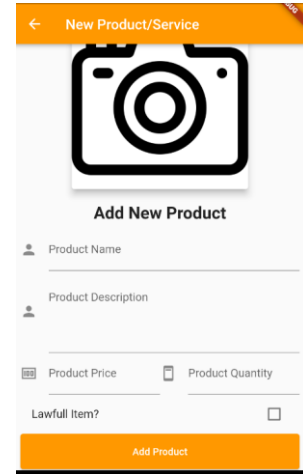


Figure 12: Adding New Product

Figure 13 shows the pending product that needs admin's approval. Figure 14 shows the bid success items page. It shows the item that the user has successfully bid on. They can view the name of item and the price that they use to bid on the item. Figure 15 shows the user's profile page. Users can update their name, phone, password inside this page and they are able to logout the application at this page as well.

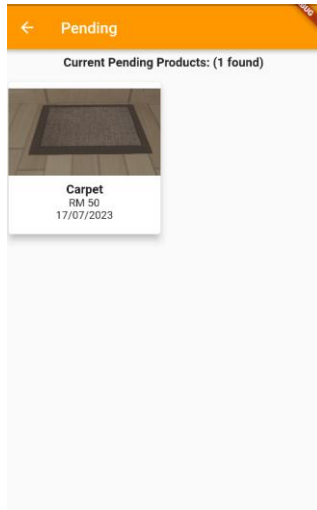


Figure 13: Pending for Approval

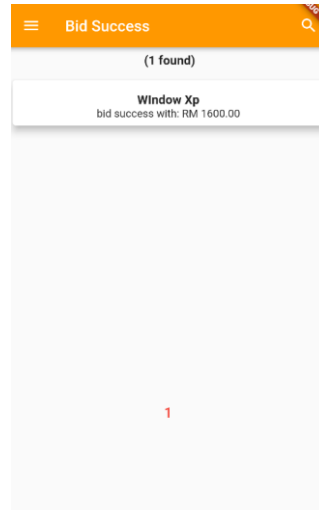


Figure 14: Success Bidding

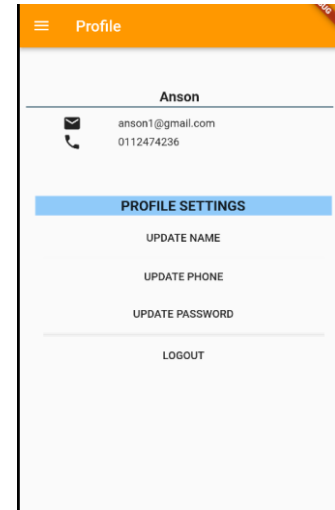


Figure 15: User Profile

V. EVALUATION

The evaluation that has been used in this project to get feedback from the target users is usability testing through quantitative method. Usability testing is chosen as the project focuses on the performance of application and how users think about the interface. Improvements of the application are conducted after receiving feedback from user for further improvement.

The objective of this evaluation is to check user requirement functionality. This test is aimed to evaluate the effectiveness of the application to complete its job. This evaluation is taken as reference for developing the application into more user-friendly, to meet user's expectation, resolve the bug and to make improvement based on their feedback. Out of 30 respondents, there are 70% of them are male and 30% of them are female. There are 80% of the participants never used any tender and asset management mobile application and 16.7% of them has used similar application before. But there are 3.3% of participant state that they maybe used the application before.

A set of questionnaires made from Google Form and the link for the application's system is being used as instrument to go through the field testing of this project. The instrument is useful to collect the response and analyse them. Through the instrument, it is expected that the collection of responses should be easier and present a result that reflects the objectives of the evaluation. Google Platform includes several questions that related to the usability of application such as evaluating in terms of user interface and navigation, function and feature and overall experience. In user interface and navigation, it has five questions while in function and feature, it has six questions, and each question has three questions to be evaluated. The collected data justified how useful the application toward different roles of users. Participant used the application with the roles given and interact with the application. Participants filled the Google Form to answer the questionnaire for evaluation purpose.

VI. FINDINGS AND RESULTS

Figure 16 shows the feedback of 'Interface and Navigation'. For the first question in 'Interface and Navigation', 14 of the users feel that the colour is satisfying. But 12 users feel the colour is normal, so they pick neutral. And the application is easy to understand for them. It shows that the application is user friendly to them. There are 17 of them choose 'satisfy' and 10 of them choose 'very satisfying'. This application is user friendly as well. There are 15 users who choose 'satisfy' and 14 of them chose 'very satisfying'. As for visual appealing, there are 14 users who are satisfied with the visual and there are 11 users who choose neutral. But there is 1 user who thinks that the visual is unsatisfied. Lastly, there are 15 people who think that the buttons are clear and intuitive for them 10 of them feel very satisfied with this function.

Interface and Navigation

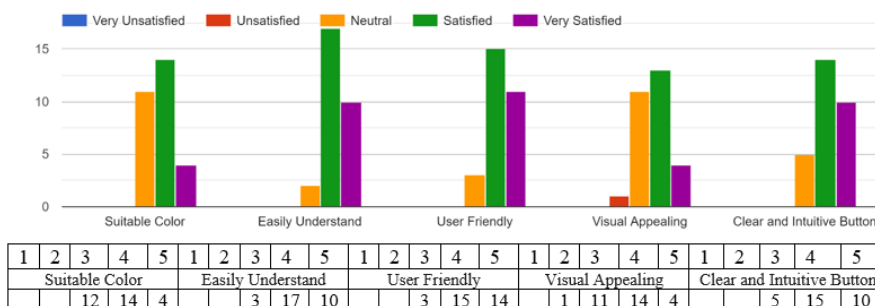


Figure 16: Feedback of 'Interface and Navigation'

For the first question in 'Login and Register' function (as shown in figure 17), there are 15 users who think that the function is satisfying but there is 1 user who thinks that this function is not satisfying. The second question is whether the flow of function is good. There are 16 users who are satisfied with the flow and 7 of them feel neutral and 7 very satisfy with the flow. The last question is 'It does not confuse user'. Most of them think that this function does not confuse them and 11 of them are very satisfied with it.

Login and Register

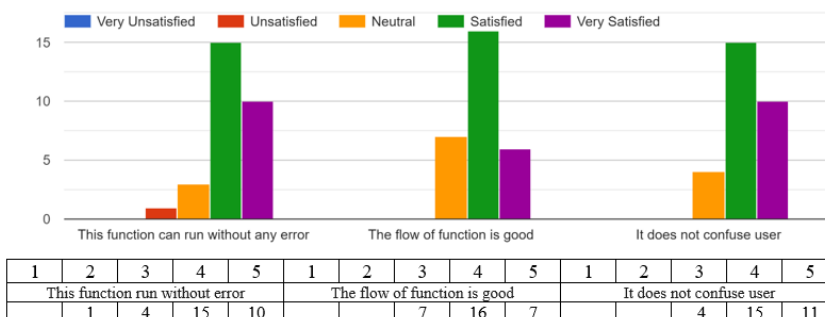


Figure 17: Feedback of 'Login and Register'

As shown in figure 18, there are 14 of them very satisfy with the function that can run without error and 12 of them are satisfied with it as well. But for the second question, 14 of them think that the flow is satisfying and 9 of them think that the flow is very satisfying. As for the last question, 14 of them are satisfied that it does not confuse user and 11 of them thinks that it is very satisfied, and it does not confuse users. There are only 5 users thinks that this function is neutral.

Register Product

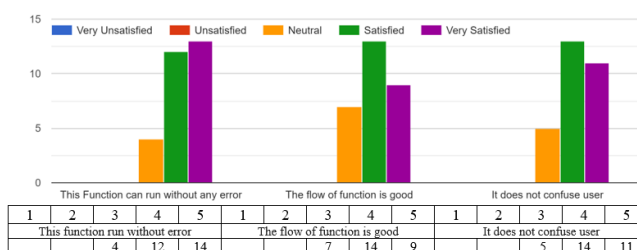


Figure 18: Feedback of 'Register Product'

Figure 19 shows the feedback result of Bid Product. For the first question in Bid product function, there are 12 of user choose neutral for this function can run without error, there are 7 of them are satisfied and 7 of them very satisfy with this this question. Next, 17 of the users think that the flow is satisfy, 8 of them stay neutral for this question and 4 of the users are very satisfied with the flow of this function. For the last question

there are 11 of them who think that it does not confuse them and 10 of them stay neutral. There is 1 user who thinks that this function confusing them and 8 of them are very satisfy that this function does not confuse them.

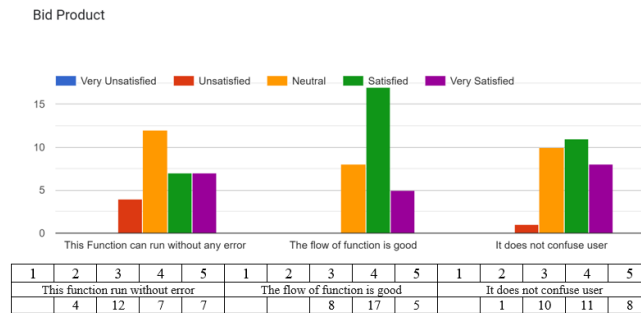


Figure 19: Feedback of 'Bid Product'

Figure 20 shows the feedback of 'Edit Product Quantity'. For the first question in 'Edit Product Quantity', 17 of them think that this function can run without error and 1 of the users choose unsatisfied for this question, and 11 of them are very satisfied with the function. Next, the second question is the flow of function is good. There is overall positive feedback from users. 14 of them choose very satisfied, 9 of them choose satisfied and only 7 users choose neutral for this question. The last question is 'It does not confuse user'; this question has overall positive feedback as well. 16 of them are satisfied, 10 of them are very satisfied and only 4 of the users stay neutral on this question.

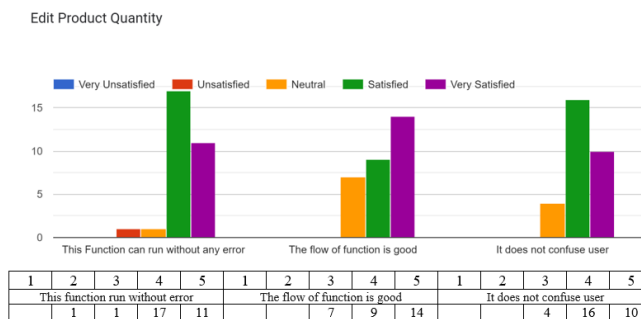


Figure 20: Feedback of 'Edit Product Quantity'

Figure 21 shows the feedback of View Bid Success Items. In the first question in this function, there is overall positive feedback where 16 of them are satisfied, 8 of them are very satisfied and 6 of them stay neutral. For the second question, there are 13 of them has choose very satisfied and satisfied and there are only 4 of the users who stay neutral for this function feedback so we can say that is has overall positive feedback in this function. In the last question, there are also mostly positive feedback as well, there are 14 users are satisfied and 13 of them are very satisfied with the application, and only 3 users choose neutral.

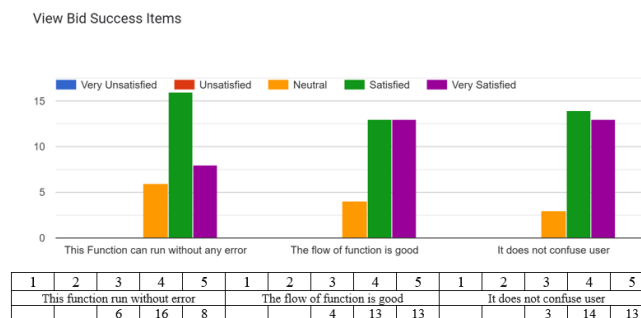


Figure 21: Feedback of 'View Bid Success Items'

Figure 22 shows the feedback of 'Manage Profile'. In the first question, there is one user who are unsatisfied with it but majority of them which is 17 of the users are very satisfied with the function continued by 10 users satisfied and 4 users are neutral with the question. In the second question, most of them give positive feedback, where 14 of them are very satisfied and 12 of them are satisfied with the function. There are only 4

users who choose neutral in this question. In the last question, most of the positive feedback received where 14 of the users are very satisfied and 12 of them are satisfied with the function. There are only 4 users who choose neutral in this question.

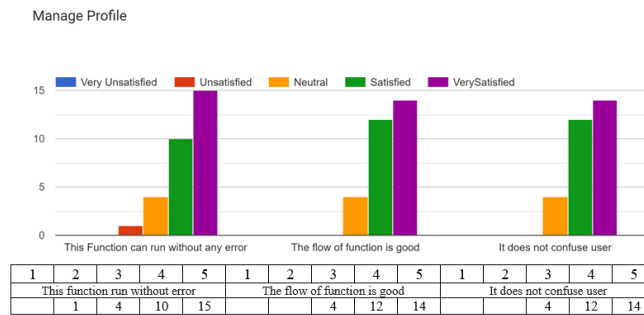


Figure 22: Feedback of ‘Manage Profile’

Figure 23 shows the overall experience toward the application. Most of the users (56.70%) thinks that it is a good experience when they are using the application and 30% of them are very satisfy when using the application. Only 13.3% of users feel neutral toward the application.

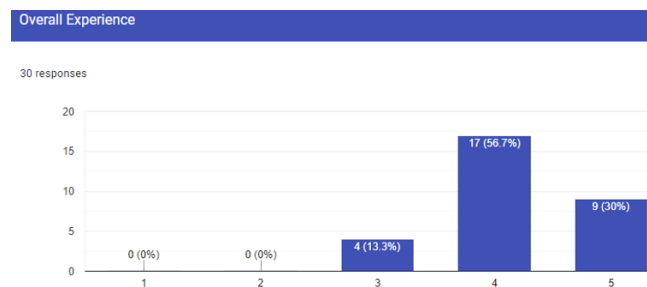


Figure 22: Feedback for Overall Experience

VII. CONCLUSION

In conclusion, this project has described the development and the design for E-Asset & Tendering Management System designed for buying and selling. The evaluation testing has shown positive feedback which has proved that the application is useful, and it might help companies to add products and sell products more efficiently. Most of the feedback from respondent shows positive feedback and satisfied with the functions and usage of the application. This project holds significant importance as it aims to expedite and simplify transactions between sellers and buyers, eliminating delays that may arise from waiting for approvals on the seller side. By implementing this system, once a transaction is approved by the administrator, the seller can promptly send the required quotation to the buyer. This streamlined process enhances efficiency and reduces unnecessary waiting times, ultimately benefiting both tenders and vendors in their business interactions. In addition, an open section is being asked as the last question in the Google Form to receive feedback from the users. Some suggestions from the users among others are the bidding part and the display item page need some improvement, include a manual, and the process of bidding can be bettered.

REFERENCE

- [1] P. Kumar, “What is Tender Management? When does Tender Management Start,” www.academia.edu, Accessed: Aug. 01, 2023. [Online]. Available: https://www.academia.edu/14485462/What_is_Tender_Management_When_does_Tender_Management_Start (Accessed: 23 July 2023).
- [2] “Asset Management System,” SourceForge, Nov. 06, 2015. <https://sourceforge.net/projects/assetmgmtsystem/> (Accessed: 23 July 2023).
- [3] What the Waterfall Project Management Methodology can (and can’t) do for you (2018) Lucidchart. Available at: <https://www.lucidchart.com/blog/waterfall-project-management-methodology> (Accessed: 25 July 2023).
- [4] Wysocki, R. K. (2014). *Effective Project Management: Traditional, Agile, Extreme* (7th ed.). Wiley.
- [5] Pinto, J. K., & Slevin, D. P. (2017). Critical Success Factors Across the Project Life Cycle. *Project Management Journal*, 48(3), 16–27.
- [6] Pressman, R. S., & Maxim, B. R. (2014). *Software Engineering: A Practitioner’s Approach* (8th ed.). McGraw-Hill Education.
- [7] Sommerville, I. (2015). *Software Engineering* (10th ed.). Pearson Education Limited.
- [8] Kerzner, H. (2017). *Project Management Metrics, KPIs, and Dashboards: A Guide to Measuring and Monitoring Project Performance* (3rd ed.). Wiley.